查询UC1730供应商

INTEGRATED CIRCUITS
UNITRODE

Thermal Monitor

FEATURES

- On-Chip Temperature Transducer
- Temperature Comparator Gives Threshold Temperature Alarm
- Power Reference Permits Airflow Diagnostics
- Precision 2.5V Power Reference Permits Airflow Diagnostics
- Transducer Output is Easily Scaled for Increased Sensitivity
- Low 2.5mA Quiescent Current

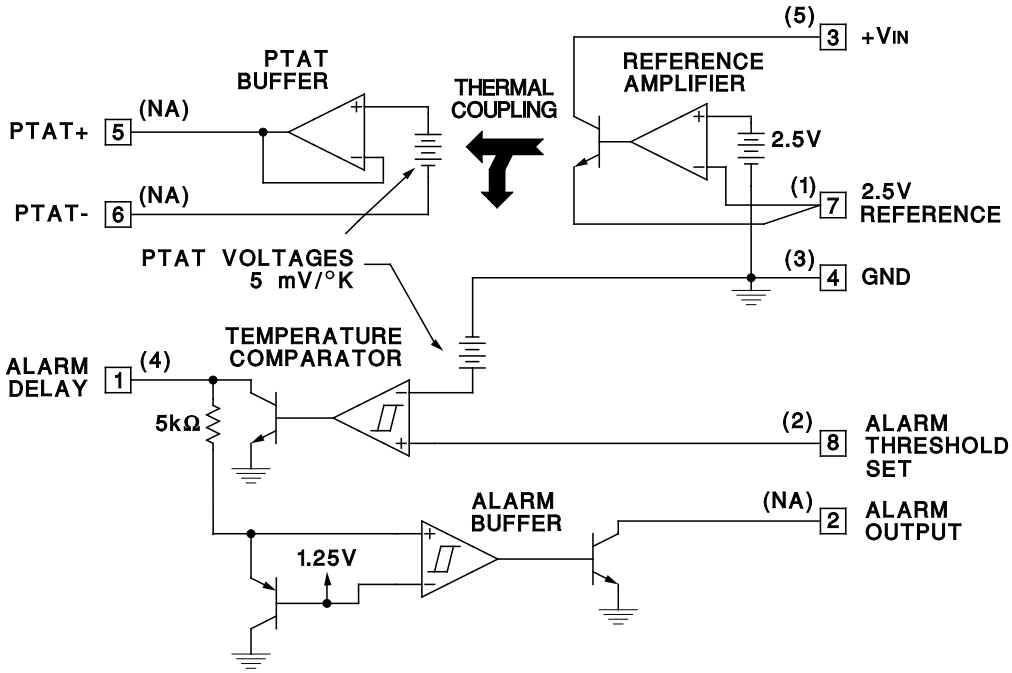
DESCRIPTION

The UC1730 family of integrated circuit devices are designed to be used in a number of thermal monitoring applications. Each IC combines a temperature transducer, precision reference, and temperature comparator allowing the device to respond with a logic output if temperatures exceed a user programmed level. The reference on these devices is capable of supplying in excess of 250mA of output current – by setting a level of power dissipation the rise in die temperature will vary with airflow past the package, allowing the IC to respond to airflow conditions

These devices come in an 8-Pin DIP, plastic or ceramic, a 5-Pin TO-220 or a PLCC-20 version. In the 8-Pin version, a PTAT (proportional to absolute temperature) output reports die temperature directly. This output is configured such that its output level can be easily scaled up with two external gain resistors. A second PTAT source is internally referenced to the temperature comparator. The other input to this comparator can then be externally programmed to set a temperature threshold. When this temperature threshold is exceeded an alarm delay output is activated. Following the activation of the delay output, a separate open collector output is turned on. The delay pin can be programmed with an external RC to provide a time separation between activation of the delay pin and the alarm pin, permitting shutdown diagnostics in applications where the open collector outputs of multiple parts are wire OR'ed together.

The 5-Pin version in the TO-220 package is well suited for monitoring heatsink temperatures. Enhanced airflow sensitivities can be obtained with this package by mounting the device to a small heatsink in the airstream. This version of the device does not include the PTAT output or the open collector alarm output.

BLOCK DIAGRAM



Pin numbers shown for 8-Pin DIP, ( ) number for 5-Pin TO-220.

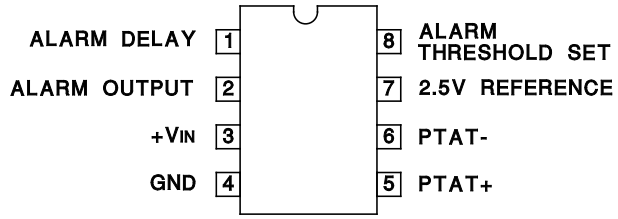
ABSOLUTE MAXIMUM RATINGS

Input Supply Voltage, (+V_{IN}) 40V
Alarm Output Voltage (8-Pin Version Only) 40V
Alarm Delay Voltage 10V
Alarm Threshold Set Voltage 10V
2.5V Reference Output Current . . . . . -400 mA
Alarm Output Current (8-Pin Version Only) . . . . . 0 mA
Power Dissipation at T_A = 25°C (Note 2) . . . . . 1000 mW
Power Dissipation at T_C = 25°C (Note 2) . . . . . 2000 mW
Thermal Resistance Junction to Ambient
N, 8-Pin Plastic DIP . . . . . 110°C/W
J, 8-Pin Ceramic DIP . . . . . 110°C/W
T, 5-Pin Plastic DIP TO-220 . . . . . 65°C/W
Thermal Resistance Junction to Case
N, 8-Pin Plastic DIP . . . . . 60°C/W
J, 8-Pin Ceramic DIP . . . . . 40°C/W
T, 5-Pin Plastic TO-220 . . . . . 5°C/W
Operating Junction Temperature . . . . . -55°C to +150°C
Storage Temperature . . . . . -65°C to +150°C
Lead Temperature (Soldering, 10 Seconds) . . . . . 300°C

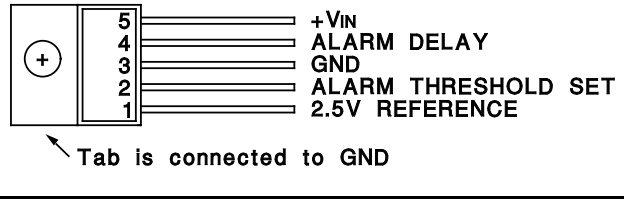
Note 1: Voltages are referenced to ground. Currents are positive into, negative out of, the specified terminals.
Note 2: Consult Packaging section of Databook for thermal limitations and considerations of package.

CONNECTION DIAGRAMS

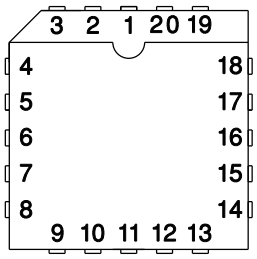
DIL-8 (TOP VIEW)
N or J Package



5-PIN TO-220 (TOP VIEW)
T Package



PLCC-20 (TOP VIEW)
Q Package



PACKAGE PIN FUNCTION	
FUNCTION	**PIN**
N/C	1-3
ALARM DELAY	4
ALARM OUTPUT	5
+V_{IN}	6
GND	7
N/C	8-13
PTAT+	14
PTAT-	15
2.5V REFERENCE	16
2.5V REFERENCE	17
ALARM THRESHOLD SET	18
N/C	19-20

ELECTRICAL CHARACTERISTICS: Unless otherwise stated, these specifications apply for T_J = 0°C to +100°C for the UC3730, -25°C to + 100°C for the UC2730 and -55°C to +125°C for the UC1730, +V_{IN} = + 5V, and PTAT– = 0V. T_A = T_J.

PARAMETERS	TEST CONDITIONS	MIN	TYP	MAX	UNITS
INPUT SUPPLY					
Supply Current	+V_{IN} = 35V		2.8	4.0	mA
	+V_{IN} = 5V		2.3	3.5	mA
REFERENCE					
Output Voltage	T_J = 25°C	2.475	2.5	2.525	V
	Over Temperature	2.46		2.54	V
Load Regulation	I_{OUT} = 0 to 250mA		8.0	25	mV
Line Regulation	+V_{IN} = 5 to 25V		1.0	5.0	mV
TEMPERATURE COMPARATOR					
Temperature Comparator Threshold	at 300°K (26.85°C), Nominally 5mV/°K, V_{INPUT} High to Low	1.475	1.50	1.525	V
Temperature Error		-10		10	°C
Threshold Line Regulation	+V_{IN} = 5 to 25V		0.005	0.02	%/V
Temperature Linearity	Note 2		2.0	5.0	°C
Threshold Hysteresis		3.0	8.0	15	mV
Input Bias Current	V_{INPUT} at 1.5V	-0.5	-0.1		µA
Max Output Current	V_{OUT} = 1V	1.2	3.0		mA
Output Sat Voltage	I_{OUT} = 100µA		0.05	0.25	V

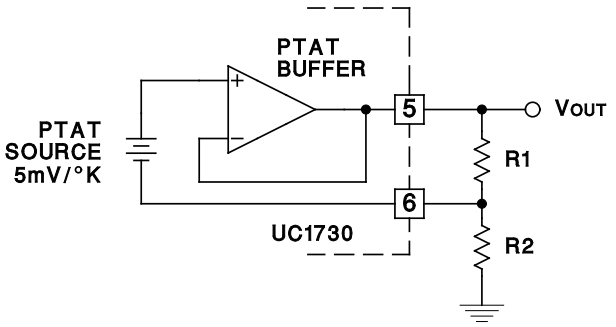
ELECTRICAL CHARACTERISTICS (cont): Unless otherwise stated, these specifications apply for T_J = 0°C to +100°C for the UC3730, -25°C to + 100°C for the UC2730 and -55°C to +125°C for the UC1730, $+V_{IN}$ = + 5V, and PTAT– = 0V. $T_A = T_J$.

PARAMETERS	TEST CONDITIONS	MIN	TYP	MAX	UNIT
TEMPERATURE COMPARATOR (cont.)					
Output Leakage Current	V_{OUT} = 1V		0.01	1.0	µA
PTAT BUFFER (8-Pin N, or J Version Only)					
Output Voltage	at 300°K (26.85°C), Nominally 5mV/°K	1.460	1.50	1.54	V
	In 10X Config. + V_{IN} = 25V	14.6	15	15.4	V
Temperature Error		-12		12	°C
Temperature Linearity (Note 2)			2.0	5.0	°C
Line Regulation	+V_{IN} = 5 to 25V		0.02	0.04	%/V
Load Regulation	I_{OUT} = 0 to 2mA		1.0	3.0	mV
Dropout Voltage	PTAT + TO +V_{IN}		1.9	2.5	V
Input Bias Current at PTAT– Input		-3.0	-1.0		µA
ALARM BUFFER COMPARATOR (8-Pin N, or J Version Only)					
Threshold Voltage (V_{TH})	Alarm Delay Input Low to High	1.1	1.2	1.3	V
Threshold Hysteresis Voltage	Alarm Delay Voltage > V_{TH}		100	250	mV
Input Bias Current	Alarm Delay Voltage < V_{TH}		0.1	0.5	µA
Max Output Current	V_{OUT} = 1V	7.0	15		mA
Output Sat Voltage	I_{OUT} = 3mA		0.25	0.45	V
Output Leakage	V_{OUT} = 35V		0.1	2.0	µA

Note 2: This parameter is guaranteed by design and is not tested in production.

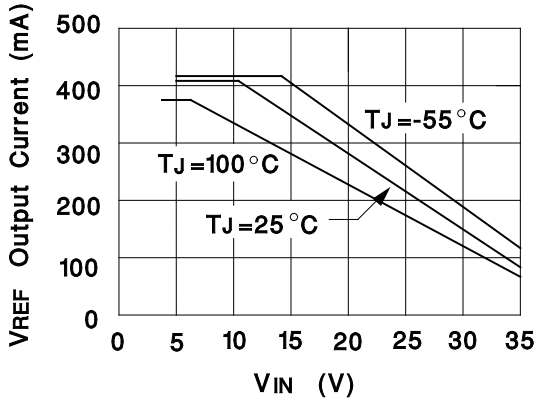
APPLICATIONS AND OPERATION INFORMATION

Scaling the PTAT Output (8 Pin Version Only)

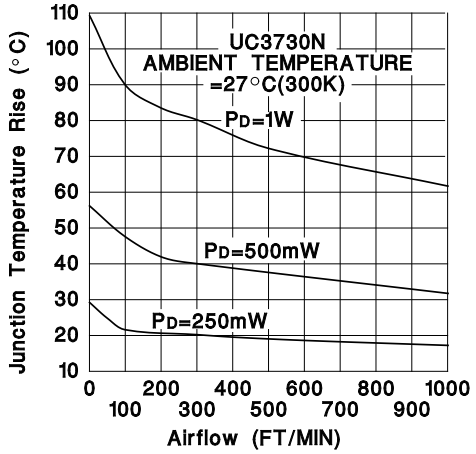


$$V_{OUT} = 5 \times \left(1 + \frac{R2}{R1}\right) mV/°K$$

(Recommended Range for R1 is 2k to 4k)



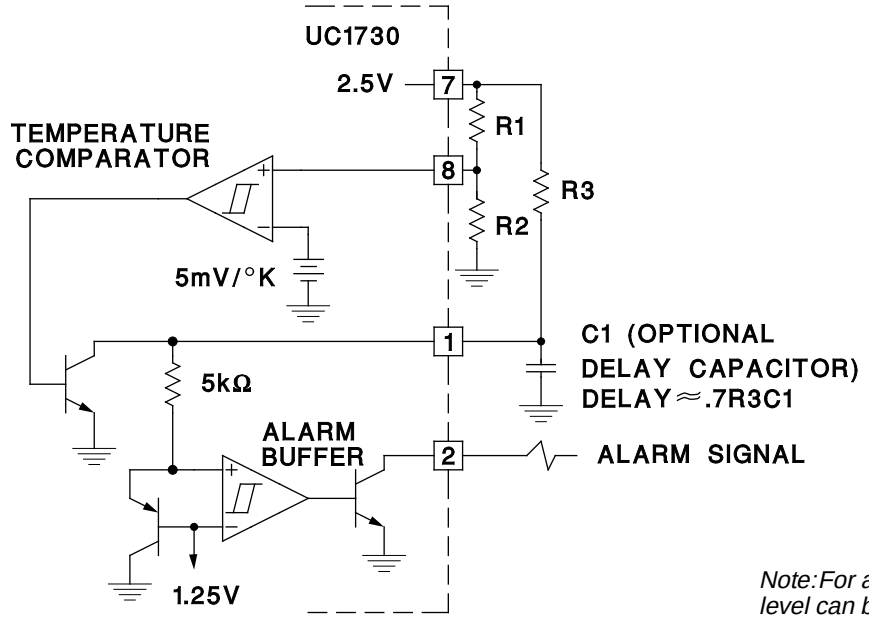
V_{REF} Maximum Output Current vs Input Supply



Junction Temperature Rise vs Airflow UC3730N (8-Pin Plastic Dip)

APPLICATIONS AND OPERATION INFORMATION (Cont.)

Setting a Temperature Threshold

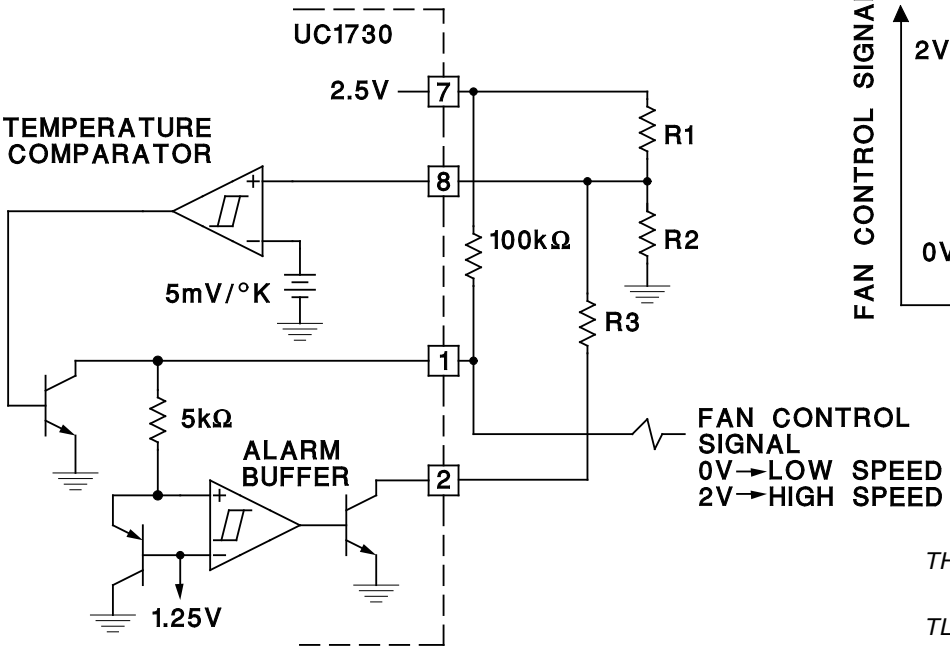


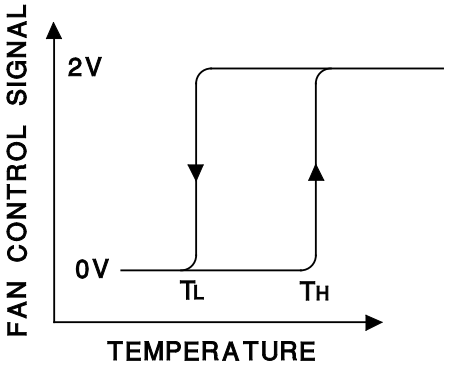
Temperature Threshold (°C)

$$= \left(\frac{2.5V}{0.005}\right) x \frac{R2}{R1+R2} - 273.15$$

Note: For airflow monitoring a power dissipation level can be set with a resistive load, R_L, on the reference output. $P_D = (+V_{IN} - 2.5V)^2/R_L$.

Dual Speed Fan Control





$$TH(°C) = \frac{2.5V}{0.005} x \frac{R2}{R1+R2} - 273.15$$

$$TL(°C) = \frac{2.5V}{0.005} x \frac{R_X}{R1+R_X} - 273.15$$

$$\text{Where: } RX = R2 \times \frac{R3}{R2+R3}$$

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